UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/589,923	08/17/2006	Stefan Amon	AT04 00008US1	3761

65913 7590 11/17/2010

NXP, B.V.
NXP INTELLECTUAL PROPERTY & LICENSING
M/S41-SJ
1109 MCKAY DRIVE
SAN JOSE, CA 95131

EXAMINER	
HORNING, JOEL G	
ART UNIT	PAPER NUMBER
1712	

NOTIFICATION DATE	DELIVERY MODE
11/17/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

Office Action Summary	Application No.	Applicant(s)	
	10/589,923	AMON ET AL.	
	Examiner	Art Unit	
	JOEL G. HORNING	1712	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 September 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4,6-10 and 20-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,6-10 and 20-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Application

1. By amendment filed September 12th, 2010, claims 20 and 21 have been amended. Claims 1, 2, 4, 6-10 and 20-22 are currently pending.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

2. **Claim 1, 2, 4 and 7** are rejected under 35 U.S.C. 103(a) as being unpatentable over Nonaka (JP-04120900, as shown by the Derwent English abstract) in view of in view of Kishima (US 4668588) in view of Fukazawa et al (JP 01193847, as shown by the Derwent English abstract).

Nonaka is directed towards a method for stiffening and improving the weather resistance of a speaker diaphragm (electro acoustic transducer) by coating it with a polymer layer. In the process, a liquid solution (70% toluene) of a polymer is spray

coated **(claim 2)** onto both faces of the polymer diaphragm of a speaker so that it adheres there. The polymer is then cured by exposure to UV light **(claim 4)**. Nonaka does not teach heating the liquid plastic that has been applied onto the surface of the substrate before curing it.

However, Kishima is also directed towards using UV curable polymer solutions (UV curable paint) in order to form polymeric layers (paint layers) (abstract). It teaches that after the liquid polymer layer is deposited the solvent should be removed, by heating the layer for some time, before UV curing (col 5, lines 45-58) in order to improve the surface properties of the resulting polymer layer (col 6, lines 7-12).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to heat the deposited liquid polymer layer for some time before UV curing it in order to remove the solvent from the layer and produce a cured polymer layer with better surface properties.

Furthermore, Fukazawa et al is also directed towards methods of effectively applying and curing UV curable liquid polymer resins onto substrates. It teaches that in order to improve the uniformity of the polymer layer formed from the liquid UV curable resin, it is important to control the viscosity of the liquid polymer before it is cured. It teaches that the viscosity is affected by the temperature and so teaches heating the liquid polymer which produces a (lower) viscosity that allows a more uniform coating to be produced (abstract).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to expect that heating the liquid polymer would also produce the benefit of creating a more uniform coating, since it was known that doing so would enable a more uniform coating **(claim 1)**.

3. Regarding **claim 7**, as indicated by Kishima, the waiting time (drying time) is a result effective variable for determining the degree of drying (for a given solvent, volume of solvent and temperature). Additionally, drying time is also a result effective variable for determining the length of the coating process. Shorter dying times result in a faster process, but may not dry the coating sufficiently. Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to choose the instantly claimed ranges of "between 1 and 15 seconds" through process optimization, since it has been held that when the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980). Additionally, this indicates that this chosen optimal processing time would be different than the optimal processing time for a process with a different processing parameters (e.g. a different amount of solvent or temperature).
4. **Claims 6 and 10** are rejected under 35 U.S.C. 103(a) as being unpatentable over Nonaka (JP-04120900, as shown by the Derwent English abstract) in view of in view of Kishima (US 4668588) in view of Fukazawa et al (JP 01193847, as shown by the Derwent English abstract) further in view of Brennan (US 2408038, hereafter referred to as "the '038 patent").

Claim 6 further requires that a membrane or the device for applying the liquid plastic be moved during application of the liquid plastic.

Nonaka teaches spraying the liquid plastic onto the speaker membrane, but does not describe exactly how that operation occurs.

However, the '038 patent is also directed towards spraying liquid polymers (binder) (col 2, lines 49-52) onto speaker diaphragms (col 1, lines 6-9). It teaches that one suitable way of doing this is by placing the membrane on a turntable and rotating it (as can be seen in figure 4, the turntable is symmetrical about the diaphragm's central axis, so it will rotate on the central axis) while spraying the liquid polymer on the membrane. By spraying the coating this way, a substantially uniform coating is produced (col 5, lines 14-20).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to rotate the membrane during spraying in order to produce a more controlled uniform coating of the membrane **(claim 6)**.

Furthermore, the '038 patent teaches performing multiple layer deposition steps in order to produce the desired film thickness and to enable the deposition of more complex thickness profiles (masking) (col 5, lines 21-32).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to deposit the desired film thickness on the membrane by performing a succession of layer deposition steps (deposit and cure one polymer layer and then deposit and cure another layer) instead of a single step since it was a known way to deposit layer of the desired thickness and would produce predictable

results and in order to enable the formation of more complicated thickness profiles on the rotating membrane **(claim 10)**.

5. **Claim 8 is** rejected under 35 U.S.C. 103(a) as being unpatentable over Nonaka (JP-04120900, as shown by the Derwent English abstract) in view of in view of Kishima (US 4668588) in view of Fukazawa et al (JP 01193847, as shown by the Derwent English abstract) further in view of Brennan (US 2716462, hereafter referred to as "the '462 patent").

Nonaka does not teach having a creased area that surrounds a central area of the diaphragm with different amounts of polymer deposited at these two parts of the speaker diaphragm.

However, the '462 patent is also directed towards methods of stiffening speaker diaphragms by supplying a coating to the diaphragm (col 1, lines 15-31). It further teaches that the diaphragm has a central area (body area) which is surrounded by an area (rim area) that can have creases (corrugations) in order to increase the flexibility of that area. These two areas are taught to have their own separate stiffness requirements, which are met by applying different amounts of polymer reinforcement at different places on the diaphragm (using "radial filaments") so that the diaphragm will have both the proper strength in its creased area to support the body and the required flexibility in the center section in order to properly vibrate as a speaker (col 1, line 70 through col 2, line 19).

Thus, it would have been obvious to a person of ordinary skill in the art at the time of invention to use a diaphragm with a central area surrounded by a creased

area as taught by the '462 patent in the process of Nonaka in order to improve the flexibility of the diaphragm.

Claim 8 further requires that greater waiting times be used for a roughened surface than a smooth surface. Nonaka in view of the '462 patent shows that it is obvious to have different coating thicknesses on the speaker. As applied to claim 7 in the previous rejection, Kishima teaches that the waiting time (drying time) is a result effective variable. Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to choose the instantly claimed ranges of "greater than the waiting time in the case of a membrane having a smooth surface" through process optimization, since it has been held that when the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980) **(claim 8)**.

6. **Claims 9 and 10** are rejected under 35 U.S.C. 103(a) as being unpatentable over Nonaka (JP-04120900, as shown by the Derwent English abstract) in view of in view of Kishima (US 4668588) in view of Fukazawa et al (JP 01193847, as shown by the Derwent English abstract) further in view of Bozak (US 3093207).

Claim 9 further requires that the thickness ratio of the deposited layer and the membrane be between 0.5:1 and 3:1.

Nonaka does not appear to teach what the thickness ratio should be. However, Bozak is also directed towards methods for coating speaker diaphragms with polymer layers in order to stiffen the diaphragm (col 2, lines 22-53). Bozak

further teaches that the ratio of the thickness of the deposited layers and the membrane will affect the resonance of the diaphragm. The ratio should be high enough to produce the desired stiffening of the diaphragm to dampen undesirable internal vibrations, but small enough not to dampen out desired sounds (col 1, lines 23-33 with col 2, line 65 to col 2, line 11). Put another way this ratio is a result effective variable for determining the desired acoustics of the speaker diaphragm. The ratio should be large enough to dampen undesired sounds, while small enough not to dampen the desired ones.

Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to choose the instantly claimed ranges of "between 0.5:1 and 3:1" through process optimization, since it has been held that when the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980) **(Claim 9)**.

7. Regarding **claim 10**, Nonaka does not appear to teach depositing multiple polymer layers onto the membrane. However, Bozak teaches that the polymer layer should be applied to both sides (twice) of the membrane in order to produce the best acoustics (col 2, lines 33-45).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to apply the liquid plastic to the diaphragm and cure it a number of times (coat one side of the diaphragm and repeat the coating process on the other side of the diaphragm) in order to produce the best acoustics **(claim 10)**.

8. **Claim 20** is rejected under 35 U.S.C. 103(a) as being unpatentable over Nonaka (JP-04120900, as shown by the Derwent English abstract) in view of in view of Kishima (US 4668588) in view of Fukazawa et al (JP 01193847, as shown by the Derwent English abstract) further in view of Brennan (US 2716462, hereafter referred to as "the '462 patent") in view of Durbin (US 4324312).

Nonaka does not teach having a creased area that surrounds a central area of the diaphragm with different amounts of polymer deposited at these two parts of the speaker diaphragm.

However, the '462 patent is also directed towards methods of stiffening speaker diaphragms by supplying a coating to the diaphragm (col 1, lines 15-31). It further teaches that the diaphragm has a central area (body area) which is surrounded by an area (rim area) that can have creases (corrugations) in order to increase the flexibility of that area. As seen in figure 1, around the creased area **12** of the rim is an edge area. The body area and corrugations are taught to have their own separate stiffness requirements, which are met by applying different amounts of polymer reinforcement at different places on the diaphragm (using "radial filaments") so that the diaphragm will have both the proper strength in its creased area to support the body and the required flexibility in the center section in order to properly vibrate as a speaker (col 1, line 70 through col 2, line 19).

Thus, it would have been obvious to a person of ordinary skill in the art at the time of invention to use a diaphragm with a central area surrounded by a creased

area which is surrounded by an edge area as taught by the '462 patent in the process of Nonaka in order to improve the flexibility of the diaphragm.

Since the reinforcement requirements of these two areas are taught to be separate with the required stiffness being created by the amount of the polymer reinforcement sprayed onto each area, it would have been obvious to a person of ordinary skill in the art at the time of invention to then provide these separate areas with different amounts of liquid plastic material reinforcement (different amounts per unit area) in order to be able to produce the required strength in the creased area and the required flexibility in the center area in order to have an effective speaker.

Regarding the additional requirement that the raised areas and depressions extends from the edge area to the central area, '462 does not teach using that configuration.

However, Durbin is also directed towards methods of constructing speaker diaphragms (title and abstract) and, as shown in figure 11, it teaches that such a configuration for the creased area was conventional to the art as a "tangential surround" design, which had been successfully in use for speaker diaphragms since the 1930's (col 4, lines 22-26).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to use the tangential surround construction for the Nonaka speaker diaphragm, since such a construction was conventionally known to the art and would produce predictable and successful results **(claim 20)**.

9. **Claim 22** is rejected under 35 U.S.C. 103(a) as being unpatentable over Nonaka (JP-04120900, as shown by the Derwent English abstract) in view of in view of Kishima (US 4668588) in view of Fukazawa et al (JP 01193847, as shown by the Derwent English abstract) further in view of Asif (European Polymer Journal **39** (2003) 933-938) as evidenced by the definition of "ultraviolet" (retrieved from dictionary.com June 3rd, 2010).

As discussed previously Nonaka teaches using a UV curable polymer, specifically exemplifying polyphosphazene resins with toluene solvents. Nonaka does not appear to specifically teach using UV curable acrylate liquid polymer coatings.

However, Asif is also directed towards UV curable liquid polymer coating materials. It teaches that there are many different UV curable liquid polymer coating materials known to the art, including many UV curable acrylate polymers. It further teaches that there are many different acrylate systems which enable the use of water as a solvent, which avoids the environmental and legislative issues of using resin systems that use organic solvents (introduction). As evidenced by the dictionary.com definition, ultraviolet radiation is the range of wavelengths less than 400nm. MPEP 2144.05 states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists."

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to use a UV curable acrylate liquid polymer as a known alternate

UV curable resin which was known to be suitable as a coating material and would produce predictable results. Additionally, such a person would be motivated to do so in order to avoid using organic solvents in their process and the environmental and legislative issues that would result from them **(claim 22)**.

10. **Claim 21** is rejected under 35 U.S.C. 103(a) as being unpatentable over Nonaka (JP-04120900, as shown by the Derwent English abstract) in view of in view of Kishima (US 4668588) in view of Fukazawa et al (JP 01193847, as shown by the Derwent English abstract) further in view of Brennan (US 2716462, hereafter referred to as "the '462 patent") in view of Durbin (US 4324312) as applied to claim 20, further in view of Asif (European Polymer Journal **39** (2003) 933-938).

Based on what was discussed in the rejection of claim 20, it would have been obvious to a person of ordinary skill in the art at the time of invention to apply the process of Nonaka in view of Kishima in view of Fukazawa to coat a speaker diaphragm with raised areas and depressions that extend from the edge area to the central area *that had already been reinforced* by the method of the '462 patent, in order to provide it with improved weather resistance.

'462 teaches a thermoplastic that has been softened by the addition of a solvent (col 2, lines 68-72) in order to reinforce the diaphragm. '462 does not teach using a liquid plastic that is heated to produce a more uniform distribution of the plastic.

However, as discussed previously for claim 1, Nonaka teaches that UV curable liquid polymer resins are known to be used for reinforcing speaker

diaphragms, and as discussed for claim 22, Asif teaches that there are many different known UV curable liquid polymer resins used for coating materials and would be expected to produce predictable results.

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to substitute the polymer resin used to make the reinforcing structures of '462 with a UV curable liquid polymer using the process of Nonaka in view of Kishima in view of Fukazawa, particularly one that is different from the polyphosphazene material exemplified by Nonaka, such as an acrylate material taught by Asif **(claim 22)**, since it was a known coating material which would be expected to produce predictable results when applied to the diaphragm using the Nonaka in view of Kishima in view of Fukazawa process **(claim 21).**

Response to Arguments

11. Applicant's arguments with respect to claims 1, 2, 4, 6-10 and 20-22 have been considered but are not convincing in view of the new ground(s) of rejection necessitated by amendment.

12. Applicant argues that the examiner has supplied no rationale as to why a practitioner would heat the liquid polymer material before curing it. The examiner disagrees. As explained by the examiner on page 3 of the office action, as taught by Kishima, a person of ordinary skill in the art is ***motivated*** to heat the polymer before curing it in order to improve the surface properties of the cured polymer layer. On page 4, Fukazawa was used to teach that one of those expected improved surface properties of Kishima is applicant's claimed improved uniformity. Thus, as detailed

in the office action, a person of ordinary skill in the art is motivated to perform applicant's step in order to produce desirable surface properties, like applicant's claimed improved uniformity.

13. Applicant that there is no expectation of better surface properties, as taught by Kishima, in the process of Nonaka, because it uses a polyphosphazene resin. Applicant has provided no discussion as to why it would not work for the materials of Nonaka. Moreover, as explained in the office action, Kishima teaches that their heating is effective because it helps remove the solvent, which is also present in Nonaka. This mechanism applies to the resins of Nonaka (which contain 70% solvent), so there is an expectation of success. Additionally, as explained in the office action, Fukazawa also teaches a mechanism by which the surface properties of the film are improved: it lowers the viscosity of the liquid resin. This mechanism applies to the resins of Nonaka, so there is an expectation of success.

14. In response to applicant's argument that the examiner has not set forth any reasoning why it was desirable to have a more uniform coating. The examiner does not need to, because the argument present in the rejection is that the heating will produce a more uniform coating. That is sufficient to render the claims obvious.

15. Applicant's other arguments are drawn to the newly amended features, which have already been considered in the rejection above.

Conclusion

16. No current claims are allowed.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOEL G. HORNING whose telephone number is (571) 270-5357. The examiner can normally be reached on M-F 9-5pm with alternating Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael B. Cleveland can be reached on (571)272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. G. H./
Examiner, Art Unit 1712

/David Turocy/
Primary Examiner, Art Unit 1715